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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,873	09/30/2003	Sung-Bae Lee	SEC.1084	2344

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EXAMINER
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ESTRADA, MICHELLE

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 02/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/673,873	<b>Applicant(s)</b> LEE ET AL.	
	<b>Examiner</b> Michelle Estrada	<b>Art Unit</b> 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6,23,25,28,32 and 35-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 6,25,28 and 32 is/are allowed.
- 6) ☒ Claim(s) 23,35-37 and 42 is/are rejected.
- 7) ☒ Claim(s) 38,40,41 and 43-48 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 35, 36, 39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. (6,534,397) in view of Kim (6,576,947).

Okada et al. disclose forming an insulation film (13/15) on a substrate (11); forming a photoresist pattern (18) on the insulation film; performing a first etching process comprising etching the insulation film using the photoresist pattern as a mask to form an initial trench in the insulation film; subsequently removing the photoresist pattern (fig. 2G); and subsequently performing a second etching process that widens the initial trench while maintaining the depth of the trench substantially the same as that of the initial trench (Fig. 2I).

Okada et al. does not disclose wherein said second etching process being distinct from said first etching process and comprising wet etching the insulation film.

Kim discloses a wet etching that enlarges the openings (312) as shown in figs 5A and 5B.

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Okada et al. and Kim to enable the second etching step of Okada et al. to be performed according to the teachings of Kim because one of ordinary skill in the

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art would have been motivated to look to alternative suitable methods of performing the disclosed second etching step of Okada et al. and art recognized suitability for an intended purpose has been recognized to be motivation to combine. See MPEP 2144.07.

Re claims 36 and 39, Okada et al. disclose wherein said forming of the insulating film comprises forming a fluoride film (Col. 3, line 5).

Re claim 42, One of ordinary skill in the art would have been led to the recited etching rate through routine experimentation to achieve a desired etching rate. In addition, the selection of etching rate, its obvious because it is a matter of determining optimum process conditions by routine experimentation with a limited number of species of result effective variables. These claims are prima facie obvious without showing that the claimed ranges achieve unexpected results relative to the prior art range. In re Woodruff, 16 USPQ2d 1935, 1937 (Fed. Cir. 1990). See also In re Huang, 40 USPQ2d 1685, 1688 (Fed. Cir. 1996)(claimed ranges or a result effective variable, which do not overlap the prior art ranges, are unpatentable unless they produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art). See also In re Boesch, 205 USPQ 215 (CCPA) (discovery of optimum value of result effective variable in known process is ordinarily within skill or art) and In re Aller, 105 USPQ 233 (CCPA 1995) (selection of optimum ranges within prior art general conditions is obvious).

Note that the specification contains no disclosure of either the critical nature of the claimed etching rate or any unexpected results arising therefrom. Where

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patentability is said to be based upon particular chosen etching rate or upon another variable recited in a claim, the Applicant must show that the chosen etching rate are critical. *In re Woodruf*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Claims 23 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. in view of Kim as applied to claim 35 above, and further in view of Lee et al. (2002/0055271).

Okada et al. disclose depositing a conductive material (25) in the enlarged trench to form a conductive pattern in the insulation film.

The combination of Okada et al. and Kim does not disclose using etching solution including hydrogen fluoride, phosphoric acid and deionized water to enlarge the initial trench.

Lee et al. disclose using etching solution including hydrogen fluoride, phosphoric acid and deionized water to etch an insulation film (See page 10, [0137]).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Okada et al., Kim and Lee et al. to enable the wet etching of the combination to be performed according to the teachings of Lee et al. because one of ordinary skill in the art would have been motivated to look to alternative suitable methods of performing the disclosed wet etching step of the combination and art recognized suitability for an intended purpose has been recognized to be motivation to combine. See MPEP 2144.07.

Re claim 37, Lee et al. disclose wherein the second etching process comprises immersing the substrate into a bath containing an etching solution.

### ***Allowable Subject Matter***

Claims 6, 25, 28 and 32 are allowed.

Claims 38, 40, 41 and 43-48 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is 571-272-1858. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2800.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michelle Estrada  
Primary Examiner  
Art Unit 2823

ME  
February 6, 2006